



**N-Channel Enhancement-Mode
MOS Transistor**

PRODUCT DESCRIPTION

The ALPHA Semiconductor 2N7000 utilizes ALPHA's vertical DMOS technology. This device is well suited for switching applications where B_V of 60V and low on resistance (under 5 ohms) are required. The 2N7000 is housed in a plastic TO-92 package.

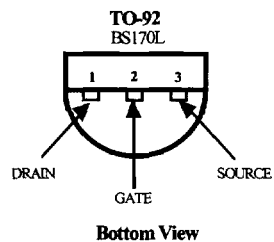
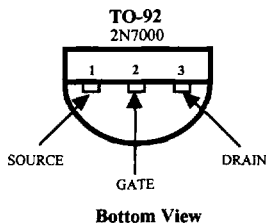
ORDERING INFORMATION

Part Number	Temperature Range	Package Type
2N7000N	-55°C to +150°C	Plastic TO-92
BS170LN	-55°C to +150°C	Plastic TO-92
2N7000X	-55°C to +150°C	Sorted Chips in Carriers

PRODUCT SUMMARY

Part Number	$V_{(BR)DSS}$ (V)	$r_{DS(ON)}$ (Ω)	I_D (A)
2N7000	60	5	0.2
BS170	60	5	0.5

Pin Connections



ABSOLUTE MAXIMUM RATINGS (T_A = +25°C, unless otherwise specified.)

Parameter	Conditions	Limits	Units
Drain-Source Voltage		60	V
Gate-Source Voltage		±40	V
Continuous Drain Current	T _A = 25°C T _A = 100°C	0.2 0.13	A
Pulsed Drain Current ¹		0.5	A
Power Dissipation ¹	T _A = 25°C T _A = 100°C	0.4 0.16	W
Operation Junction Temperature Range		-55 to 150	°C
Storage Temperature Range		-55 to 150	°C
Lead Temperature		300	°C

Thermal Resistance	Limits	Units
Junction-to-Ambient	312.5	K/W

NOTE: 1. Pulse width limited by maximum junction temperature.

SPECIFICATIONS¹

Parameter	Conditions	Min	Typ.	Max	Units
STATIC					
Drain-Source Breakdown Voltage	I _D = 10μA, V _{GS} = 0V	60	70		V
Gate-Threshold Voltage	V _{DS} = V _{GS} , I _D = 1mA	0.8	1.9	3	V
Gate-Body Leakage	V _{GS} = ±15V, V _{DS} = 0V			±10	nA
Zero Gate Voltage Drain Current	V _{DS} = 48V, V _{GS} = 0V T _C = 125°C			1 1000	μA
On-State Drain Current ³	V _{DS} = 48V, V _{GS} = 0V	75	210		mA
Drain-Source On-Resistance ³	⁴ V _{GS} = 4.5V, I _D = 75mA V _{GS} = 10V, I _D = 0.5A T _C = 125°C		4.8 2.5 4.4	5.3 5 9	Ω
Drain-Source On-Voltage ³	⁴ V _{GS} = 4.5V, I _D = 75mA V _{GS} = 10V, I _D = 0.5A T _C = 125°C		0.36 1.25 2.2	0.4 2.5 4.5	V
Forward Transconductance ³	V _{DS} = 10V, I _D = 0.2A	100	170		mS
Common Source Output Conductance ^{3,4}	V _{DS} = 5V, I _D = 50mA		500		μS
DYNAMIC					
Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1MHz		16	60	pF
Output Capacitance ⁴	V _{DS} = 25V, V _{GS} = 0V, f = 1MHz		11	25	pF
Reverse Transfer Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1MHz		2	5	pF
SWITCHING					
Turn-On Time	V _{DD} = 15V, R _L = 25Ω, I _D = 0.5A V _{GEN} = 10V, R _G = 25Ω (Switching time is essentially independent of operating temperature)		7	10	nS
Turn-Off Time	V _{DD} = 15V, R _L = 25Ω, I _D = 0.5A V _{GEN} = 10V, R _G = 25Ω (Switching time is essentially independent of operating temperature)		7	10	nS

Notes:

1. T_A = 25°C unless otherwise specified
2. For design aid only, not subject to production testing.
3. Pulse test; PW = ≤300μS, duty cycle ≤3%.
4. This parameter not registered with JEDEC.